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ABSTRACT

This study examined the relationship and relative importance of selected variables to successful performance of urban community college students on the American College Testing Program (ACT) College Outcome Measures Program (COMP). The importance of age, race, gender, type of degree, program or major category, admissions criteria and ACT pre-entrance scores was investigated using data from 696 Shelby State Community College students. Canonical analyses, multiple analysis of variance (MANOVA), and multiple regression analyses provide statistically significant indicators of more successful and less successful subgroups. Younger black students (particularly female) enrolled on an open admissions basis in career track degree programs were identified as having lower performance. Older students, white ethnics group students, and transfer degree students had higher COMP performance than their conterparts with the exception of nursing and allied health program students. The need to develop educational interventions or instructional strategies to increase skills of target subgroups was identified. (Author/BS)

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Multivariate Analyses of Urban Community College Student Performance On The ACT College Outcomes Measures Program Test

Multivariate relationships of independent variables (age, sex, race, degree, major, ACT pre-entrance score) to general education knowledge and skills as measured by six subtests of the ACT-COMP were investigated. The sample consisted of 696 urban community college students.

Canonical analyses, MANOVA, and multiple regression provided statistically significant indicators of more successful and less successful subgroups. Younger black students (particularly female) enrolled on open admissions basis in career-track degree programs were identified as having lower performance.

The need to develop educational interventions or instructional strategies to increase skills of target subgroups was identified.

Multivariate Analyses of Urban Community College Student Performance on the ACT College Outcomes Measures Program Test

INTRODUCTION

The major purpose of the study was to examine the relationship and relative importance of selected variables to successful performance of urban community college students on the ACT College Outcome Measures Program (COMP) objective test. Specifically, the importance of age, race, gender, type of degree, program/major category, admissions criteria, and ACT pre-entrance scores was investigated. Instructional strategies for increasing general education knowledge and skills could then be developed for subgroups of students with less successful performance on the COMP.

Measurement of the improvement of general education skills was the aim of the COMP examination. The American College Testing Program developed the test in 1976 to assist colleges and universities in their efforts to help students to persist to graduation and to acquire knowledge and skills important to functioning effectively in society following graduation.

There is a very limited amount of published research on performance of community college students on the COMP objective test. In 1975, Farver, Sedlacek, and Brooks noted that " . . .our institutions are changing and more blacks are entering colleges and universities. ." (p. 249) They further warned that race/sex subgroups should be differentially predicted and additional variables such as external control researched and used.

In one of the few published articles on the COMP Objective Test, Ward and Pringle (1984) examined the quality of nontraditional graduates based on performance on the COMP. They point out that ". . .few direct comparisons of traditional and nontraditional students' actual performance have been made. . ." and "little distinction is made between nontraditional students (in terms of age, education, etc.) and nontraditional programs." (p.368) These authors established

that reliability estimates on the COMP for nontraditional students in their study were similar to those of a norm-reference group of traditional students. They concluded that the results of their study demonstrated that the COMP Objective Test was not biased against the nontraditional students in their sample.

The population of students at Shelby State Community College (SSCC) could be described as nontraditional on the basis of age, race and other demographics. The average age of students completing degree requirements at the college was 31 years and many of the students depended on financial aid or were employed on a full-time basis, and could be classified as first generation college students.

METHODS

Shelby State Community College (SSCC), an urban college with a predominantly black, female enrollment has an open admissions policy for all but nursing and allied health programs. All students completing any type of degree program (transfer or career) were required to take the COMP in order to graduate, however, graduation was not contingent on the magnitude of the score. The COMP was designed specifically to measure skills of students in degree programs with a general education component. Community college transfer programs designed to prepare students who plan to complete a four year degree (university parallel) should be the target group for the COMP assessment. University parallel degree programs are referred to as "transfer" degree programs in this study. However, career degree programs at SSCC also have a general education core, therefore the test was also considered appropriate for this subpopulation.

The COMP was administered to all SSCC students who filed an "intent to graduate " form in 1982 and 1983. COMP scores were available on 696 examinees. The test scores were machined-scored at ACT and returned on tape to SSCC.

Matching social security number against the Student Master and Archival

Student Master files subsequently assured correctly coded information relative to demographics, degree and major.

Frequencies and descriptive statistics were obtained to provide a profile of the examinees. Table 1 includes a description of the distribution of characteristics of the examinees and the mean of the COMP total score for the subgroups listed. Canonical correlation analysis was used to assess the multivariate relationship between a predictor set of variables including age, sex, race, degree type, program category based on major, and ACT assessment scores, and a dependent set that consisted of the 6 subtest scores of the COMP. The six subtest scores were: 1) Functioning within Social Institutions, 2) Using Science and Technology, 3) Understanding the Arts, 4) Communicating, 5) Solving Problems and 6) Clarifying Values.

Dummy coding was used for the degree and sex variables. Exact age at the time of testing was used in canonical and regression analyses. In order to use program/major as a predictor variable for the nine categories, criterion-scaled coding was utilized. The technique involved substituting the group mean on the COMP total score for each category as a proxy. Analyses of variance (ANOVA) and t-test analyses were used to determine if means were significantly different among subgroups for purposes of interpretation in the multivariate analyses. Multiple regression analyses were used as followup to the significant canonical analysis.

Multivariate analyses of variance (MANOVA) were used to compare group performance on the COMP. MANOVA analyses comparing group performance based on age, type of degree, sex, race and major were utilized with the 6 subtest scores as the dependent measures. Univariate analyses of variance were used as followup to significant MANOVAs.

Table 1

Characteristics of SSCC 1982-83 ACT-COMP Examinees

Variable	Category	Category Frequency	Mean on COMP Total Score
Academic Year	1982	297	168.1898
	1983	399	171.4411
Gender	Female	527	169.1803
	Male	169	172.6627
Type of Degree	Transfer	173	168.0231
	Career	523	170.6883
Age Group	19-below	6	na
	20-22	170	162.6294
	23-30	267	170.7228
	31-over	233	174.9742
	Missing	20	na
Ethnic Group	Black	372	163.8898
	Nonblack	322	177.1863
	Missing	2	na
Program/Major	Business	148	167.1351
	Office Administration	33	158.1515
	Early Childhood Education	39	155.1795
	Consumer Studies	68	158.2794
	Nursing	230	181.1870
	Other Allied Health	60	171.1500
	Public Service	29	162.6897
	Liberal Arts/Gen. Sciences	50	170.6400
	General Education	39	163.4872

Total N = 696
Grand Mean 170.0259

RESULTS

Descriptive Statistics

The means on the COMP total were obtained for all subgroups and the following means were found to be significantly different at $p \leq .05$ based on t-test and ANOVA: 1) career students had a higher mean than transfer degree students when allied health majors were included as career; 2) transfer degree students had a higher mean when allied health students were not included as career; 3) males had a higher mean as a group than females; 4) white students had a higher group mean than the black student group mean; 5) older students (over 30) and (over 22) had higher group means than younger students (under 23).

Canonical Correlation Analyses

Canonical analysis that included all nine program/major categories as predictors resulted in the extraction of two significant canonical variates. The structure coefficients ($\geq .30$) that loaded on the first variate reflected characteristics of examinees more successful on the COMP, i.e. white ethnic group, higher ACT assessment scores, and program/major category requiring admissions selection criteria. The second variate had loadings that reflected characteristics of less successful examinees: female, black ethnic group, younger, and enrolled in a career degree program. Structure coefficients on all the original variables, with the exception of gender, were statistically significant with $p \leq .05$. Table 2 presents the results of this analysis.

Canonical analysis utilizing only program/major categories with open admissions (nursing and other allied health programs excluded) also resulted in the extraction of two significant canonical variates. In this analysis, the characteristics of higher performing students were: male gender, white ethnic

Table 2

Canonical Correlation Analysis of All 1982-83 COMP Examinees

Eigenvalue	Canonical Correlation	No. of Eigenvalues	Chi-Square	df	p
.39907	.63172	1	385.41	36	<.0001*
.03573	.18904	2	45.97	25	.0065*

Original Variable	Canonical Variate 1	Canonical Variate 2	F	p
Sex	-.128	.373*	1.85	.0877
Race	.603*	-.511*	20.52	<.0001*
Age	.272	.511*	6.31	<.0001*
ACT	.931*	.097	59.53	<.0001*
Degree	.120	.416*	2.20	.0417*
Major	.798*	.228	38.42	<.0001*

*Statistically significant with $p \leq .05$

group, older age group, higher ACT assessment score, transfer degree category and liberal arts/general science major category. The characteristics of less successful performance indicated black ethnic group, lower ACT and a career-track degree program. The results are presented in Table 3.

Multivariate Analysis of Variance (MANOVA)

MANOVA by age category, less than 23, ages 24 through 29, and age 30 and over resulted in a significant Wilk's lambda of .88547 with an approximate F-value of 7.00817 and $p \leq .001$, indicating that there were significant differences by age category on the six subtests of the COMP. Older students as a group had higher performance than younger students.

MANOVA by race (black, nonblack) resulted in a significant Hotelling's T-Square of .1844, and an approximate F-value of 21.11457 which was significant with $p \leq .01$. Followup analyses indicate that the nonblack students had significantly higher performance on all subtests of the COMP Objective Test.

MANOVA by type of degree (transfer versus career) resulted in a significant Hotelling's T-square statistic of .92438, approximate F-value of 5.43975, $p \leq .01$, indicating that transfer students have higher performance than career degree students when nursing and allied health were excluded. However, there were no significant differences in performance between transfer and career degree students when the nursing and allied health students were included as career. MANOVAs by gender (Hotelling's T-Square .01523, approximate F-value of 1.74897, $p = .107$) did not yield statistically significant results.

Multiple Regression Analyses

Stepwise multiple regression analysis with ACT assessment, age, race, gender, program/major, and degree type as predictors, and the COMP total score as the dependent variable was used as part of the followup procedure. All the predictor variables except gender were statistically significant predictors of

Table 3

Canonical Correlation Analysis of 1982-83 COMP Examinees
Open Admissions Programs

Eigenvalue	Canonical Correlation	No. of Eigenvalues	Chi-Square	df	p
.26977	.51939	1	160.19	36	>.0001*
.05059	.22492	2	38.05	25	.0458*

Original Variable	Canonical Variate 1	Canonical Variate 2	F	p
Sex	-.538*	.128	5.66	<.0001*
Race	.374*	-.566*	4.17	.0004*
Age	.272	.136	3.06	<.0061*
ACT	.833*	.417*	15.90	<.0001*
Degree	-.455*	.479*	4.80	.0001*
Major	.606*	.222	7.71	<.0001*

*Statistically significant with $p \leq .05$

the COMP total score accounting for about 40% of predicted variance. However,the ACT assessment was the strongest predictor, accounting for 35% of the variance. The remaining variables in order of magnitude were: race, age, program/major, and degree type. Table 4 presents the results of the regression analysis.

CONCLUSIONS

The results indicate that older students, white ethnic group students, and transfer degree students at SSCC have higher performance on the COMP measure than their counterparts with the exception of nursing and allied health students. These findings suggest that examinees in the transfer programs at the college have higher performance as measured by the COMP in general education skills and knowledge than do the career-track students when career students in programs with selective admissions criteria (i.e. Allied Health programs) are removed from the analysis. Students at higher risk of lower performance were younger black students (particularly female), who were enrolled on an open admissions basis in a career-track degree program.

The ACT assessment score was the most important predictor of success on the COMP total score, indicating that academic aptitude is highly related to performance of these students. Race and age of these community college students were also important predictors of successful performance.

The results of the study identified more successful and less successful performance by urban community college student groups on the COMP measure. Instructional strategies or other educational interventions may be developed to increase the general education skills of the groups predicted to be at greater risk of low performance.

In lieu of the very limited amount of published research on community college student performance on the ACT-COMP objective test, this research provided documentation for predicting subgroups at greater risk of less

Table 4

Stepwise Multiple Regression Analysis
1982-83 COMP Examinees

Step No.	Variable	R	RSQ	Increase in RSQ	F-to-Enter
1	ACT	.5885	.3463	.3463	355.9863
2	Race	.6061	.3673	.0210	22.2765
3	Age	.6168	.3805	.0132	14.2541
4	Major	.6240	.3894	.0089	9.7764
5	Degree	.6829	.3955	.0061	6.7407

successful performance in the assessment of general education skills. Further research is planned for subsequent academic years and will include a focus on gain scores of the students, i.e. gains based on estimated entering scores and exiting performance on the COMP Objective Test.

REFERENCES

1. COMP Prospectus - 1983-84, American College Testing Program, 1983.

2. Ward, E.F. and Pringle, R.A. Measuring the Quality of Non-traditional Graduates: An Evaluation of the ACT College Outcomes Measurement Project Objective Test. The North Central Association Quarterly vol. 58, no. 4, Spring, 1984, pp. 367-376.

3. Farver, A.S., Sedlacek, W. E., and Brooks, G.C. Longitudinal Predictions of University Grades for Blacks and Whites. Measurement of Evaluation in Guidance , vol. 7, 1975, pp. 243-250.